

Advanced Metallurgical Research

Funding Profile by Subprogram

(dollars in thousands)

	FY 2004 Comparable Appropriation	FY 2005 Comparable Appropriation	FY 2006 Base	FY 2006 Request	FY 2006 Request vs Base	
					\$ Change	% Change
Advanced Metallurgical Research.....	9,876	9,861	9,861	8,000	-1,861	-18.9%
Total, Advanced Metallurgical Research	9,876	9,861	9,861	8,000	-1,861	-18.9%

Mission

The Advanced Metallurgical Processes program conducts inquiries, technological investigations, and research concerning the extraction, processing, use, and disposal of mineral substances under the mineral and materials science program at the Albany Research Center (ARC) in Oregon.

Projects are focused on areas where there are large potential public benefits, but where industry would not invest on its own. The program addresses the full life cycle of materials production and cost-effective processing of improved materials through to their disposal and recycling. For example, the program seeks to determine the factors that limit service life of materials in industrial, structural, or engineering applications and to provide solutions to service-life problems through new materials technology. Since this research has application to a range of materials being used, its collective benefits are applied to a broad cross-section of the industry that could result in better products across a wide spectrum, thus improving U.S. competitiveness.

Another focus is to develop and demonstrate technologies that will create public benefits by reducing waste and pollution. For example, for the last four years the Program has sought ways to sequester CO₂, a greenhouse gas, by converting it to a stable mineral form; such a process, if proved practical and economic, could contribute to Fossil Energy's goal of a zero emission power plant. Thus, the research at ARC directly contributes to Fossil Energy's objectives by providing information on the performance characteristics of materials being specified for the current generation of power systems, on the development of cost-effective materials for inclusion in FutureGen systems, and for solving environmental emission problems related to fossil fired energy systems. The program at ARC stresses full participation with industry through partnerships and emphasizes cost sharing to the fullest extent possible.

Benefits

The Advanced Metallurgical Program creates public benefits by carrying out long-term, high-risk research on materials that are key to the energy industry. Another focus is to create public benefits through the development of technologies that reduce waste and pollution.

Detailed Justification

(dollars in thousands)

FY 2004	FY 2005	FY 2006
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Advanced Metallurgical Research	9,777	9,762	7,920
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In FY 2006, continue research contributions to Fossil Energy's FutureGen Systems in the area of increased component service life. Service improvement research by development of new materials, protection of current materials, and real-time corrosion sensors, and refractory repair techniques will be conducted for gasifier operating temperatures and pressures. Carbon dioxide containment through enhancement of natural geologic formation seals research will be performed. The Albany Research Center's support to the Solid State Energy Conversion Alliance (SECA) through material development, fabrication, and performance evaluation will continue for solid oxide fuel cell applications. *Participants include: ARC.*

In FY 2005, continue research to contribute to Fossil Energy's zero-emission energy systems by extending component service lifetimes through the improvement and protection of current materials, by the design of new materials, and by defining the service operating conditions for new materials in order to ensure their safe and effective use. Emphasis is placed on high-temperature erosion testing and modeling in environments anticipated for near zero emissions concepts, on the development of sulfidation/oxidation resistant materials, and development and repair of refractory materials, for coal gasifiers. The Albany Research Center will participate in an effort to develop, fabricate and evaluate the performance of materials to be used in solid oxide fuel cell applications. These could include metallic interconnects, seals, heat exchanger materials and reformer materials to support the SECA fuel cell goal of significantly reducing the cost of producing commercial, environmentally friendly solid oxide fuel cells. Continue research focused on developing an economically and environmentally acceptable integrated process for disposal of carbon dioxide. Redirect emphasis to application of mineral carbonation reactions to address leakage/sealing issues in geological sequestration approaches. *Participants include: ARC.*

FY 2004 funding continued development of advanced refractories for IGCC applications, CO₂ sequestration via mineral carbonation, advanced austenitic steels, and microchannel reactors for reformer and heat exchanger applications. In addition, efforts to support materials development for solid oxide fuel cell applications were initiated. *Participants included: ARC*

Program Support	99	99	80
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Fund technical and program management support.

Total, Advanced Metallurgical Research	9,876	9,861	8,000
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Explanation of Funding Changes

FY 2006 vs. FY 2005 (\$000)

Advanced Metallurgical Research

Decrease in funding is the result of consolidation of some research on mineralization for sequestration under the expanded Sequestration R&D program, and consolidation of some materials research for SECA fuel cell applications under the expanded Fuel Cells program.....

-1,842

Program Support -19

Total Funding Change, Advanced Metallurgical Research..... **-1,861**